



ATTACHMENT G

Example Business Model Elements

August 2, 2004, ZENH Workshop

CEC-PIER PV-ZENH Business Model Workshop: Examples of selected value, improved business model elements, and barriers for each stakeholder

BUILDER/DEVELOPER		
Value Proposition of PV-ZENH	Business Model Elements	Barriers
<ul style="list-style-type: none">• Provides differentiation in marketplace (e.g. “green”, lowers monthly electric bill of homeowners)• Gets product (houses) to market more quickly if there is fast-tracking at local level.• When new homeowner sees electric utility bill near \$0, may refer potential home buyer to same homebuilder.• Volume purchase may reduce cost of PV.	<ul style="list-style-type: none">• Purchase PV in volume for multiple homes/subdivisions/multi-family units to reduce cost and provide PV manufacturers with multi-year purchasing.• Minimize owner’s/buyer’s risks by working with a third party organization that eliminates the upfront capital investment in PV for the owner/buyer and then sells PV output at firm price (back to homeowner or to another party).• Roll incremental cost of PV into house price; treat it as a standard feature as opposed to an option. Make PV an “opt-out” option in the new home, as opposed to the “opt-in” option.• Assume a portion of the cost of the PV system, if local government streamlines building process and reduces time to market.	<ul style="list-style-type: none">• Do not perceive “demand pull” from consumers.• Do not want to take on risk associated with equipment, delays in schedule, obsolescence and system performance.• Risk of rebates expiring if there are delays in product delivery, interconnect, permits, and inspections.• If PV increases home price, home may be less competitive in marketplace.• PV component could be a liability (not an asset) to builders, if consumers do not like it or perceive it as a risk.

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HOMEOWNER		
Value Proposition of ZENH	Business Model Elements	Barriers
<ul style="list-style-type: none">• Satisfies green consumer's interests in attaining environmental & societal benefits.• Prestige among peers.• With storage, provides on-site electric reliability.• (Mostly) fixed price power production mitigates uncertainty of future electric rates.• Rolling PV investment into cost of home obscures pain of high first cost.• Reduction in electric bills.• New products could enhance attractiveness of residence.	<ul style="list-style-type: none">• Homeowners &/or associations own &/or operate/maintain PV.• Homeowners &/or associations enter into operations & maintenance contracts with 3rd party vendors.• Homeowners &/or associations operate "PV subdivision power plants" that sell excess power to utilities.• Affordable housing incentives provide preferential access to low interest loans for PV homes.• Allow third party to lease rooftops for fee. (eg.: utilities, independent power producers, energy service companies, finance institutions, etc.)• Homeowner association provides PV system maintenance along with other services like gardening, pool cleaning, etc.	<ul style="list-style-type: none">• Price causes sticker shock, even though first cost is barely noticeable in incremental mortgage payments.• Given choice PV and high-end upgrades (e.g., appliances, interior finish work), high-end upgrades usually win.• Additional responsibility to maintain PV system is viewed as burdensome, and sometimes, scary.• Homeowners may be concerned about aesthetics and perceive PV as risk to resale value.• Homebuyer may not qualify for loan once PV is rolled into selling price (since many households in California max out due to high housing prices.)• Since electric bill is small percentage of overall household expenditures, the potential savings offered by PV may not provide sufficient incentive for a homeowner to invest in PV.• Lack of viable market for used PV equipment causes risk of stranded investment and makes hard to finance.• Risk of PV system becoming stranded investment in case of early home sale. Current trend seems to be that customers are not thinking long-term about housing investments, but rather about next 5-7 years (average turn-over).

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PV INDUSTRY		
Value Proposition of ZENH	Business Model Elements	Barriers
<ul style="list-style-type: none"> • Improves awareness and visibility of PV as a mainstream product. • Provides a potentially high volume market to help maximize utilization of manufacturing capacity. • Diversifies portfolio of product offerings; reducing overall risk and potentially increasing overall market share. • Learning curve effect, from manufacturer through to installation and service, has potential to reduce cost of system installation and increase profit margins. • If PV financing is facilitated by third party, then much easier (more efficient, less expensive) to do business with customer. • Large potential market provides opportunity for PV industry to evolve toward inexpensive and aesthetic PV on roofs (“the golden challenge”). • Opportunities to reconfigure supply chain, so that delivery results in lower cost to end-user. 	<ul style="list-style-type: none"> • Offer builder and homeowner hassle-free package combining product and service, including equipment, installation, and follow-on service. “Package” should be faster, cheaper and a more reliable product. (e.g. Roof-top appliance). • Offer 15 - 20% reduction in system price based on aggregate purchases/volume sales (to builders, community groups, etc.). • Provide PV tiles or roofing product that is as aesthetically appealing and as easy to install as other roofing materials (no specialty services needed); with similar cost and life of conventional roofing. (e.g. PV=roof, builder sees no difference). • Package expertise and sale of PV with energy efficiency; full service ZENH company to complement builders’ core competencies. • Shift revenue model from PV system sale, to sales of related services. Provide services, such as long-term care and replacement of systems, along with PV system purchase. • Develop third-party entity that minimizes owner’s/buyer’s risks by eliminating upfront capital investment and selling electricity at firm price (to homeowner or other). • Offer to buy back PV (in case of default on project) at discounted rate in order to create secondary (used equipment) market; allows banks to collateralize PV instead of requiring additional collateral. • Add customer finance to product and service offerings (e.g. lease-purchase, or installment plans). 	<ul style="list-style-type: none"> • Initial cost too high; inhibits sales. • Market segment not sufficiently developed to provide industry assurances required to make investment in manufacturing, product innovation, etc. • Lack of assured continuity and magnitude of buy-downs and other incentives impairs forward sales. • New home buyers do not prioritize solar PV over other options. • No cost effective third-party model that bundles product, customer and finance. • Builders experience delays associated with product delivery, permitting, and interconnect; can lead to losing rebates. • Performance risks, real and perceived, impair sales and financing. • Few repeat customers since the product lasts 25 years. Each customer needs to be educated making sales expensive and online sales challenging.

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FINANCIAL INSTITUTIONS		
Value Proposition of ZENH	Business Model Elements	Barriers
<ul style="list-style-type: none"> • Provides financial return. • Whole new product line. • Provides diversification because return less correlated with other holdings. • First mover advantage establishes competitive advantage in this market. If PV continues to grow at a rapid pace; ZENH is a “ground floor” opportunity in the PV industry. • Provides product differentiator that may be useful. • Risk is relatively low as the asset life is 25 years and there is a dedicated cash flow stream to cover the debt (ie. avoided cost). • Actual performance risk is lower than perceived risk, which can keep competitors out. • Solar loans help build socially conscious image of lenders. • For financial institutions with existing social commitments to clean energy, PV projects represent a way to achieve commitment targets (for example Community Reinvestment Act* obligation). 	<ul style="list-style-type: none"> • Offer solar loans to defray upfront expense for homeowners and provide slightly preferential rates on solar component, or entire home loan (Fannie Mae, Energy Efficiency Mortgage Program). • Invest in a third party which installs systems, aggregates the revenue streams across many systems, and then bundles incentives (tax credits, accelerated depreciation, RECs, etc.). • Recognize value of the secondary (reconditioned) market for solar PV, which opens the door for PV to be used as collateral. (Note: This market still needs to be created either by a 3rd party player or PV manufacturer.) • Offer tax-exempt bond on behalf of municipal utilities or cities to provide low cost solar financing (for use by tax-exempt entity, like non-profit or government). • Use limited funding from state government to act as guarantee against solar loan defaults allowing commercial banks to extend lending for solar systems at a lower rate. • Use solar loans to cover Community Reinvestment Act obligation*. • Create a Joint Power Authority (JPA)** for local government to create a source of tax-free or low-interest loans. 	<ul style="list-style-type: none"> • Deals need to be fairly large, especially if new (i.e. “ground-breaking”), to cover associated fees and transactions costs. • To make money requires scale, and probably the commitment of large player. (e.g. Fannie Mae) • Loans and investment opportunities in PV may require time horizons that exceed comfort level and normal practices of financial institutions. • Long-term system performance risks, real and perceived. • Risk associated with certainty of revenue stream to secure debt. • The first mover will incur the costs to create the unique mechanisms. • Banks do not have an easy mechanism to use PV as collateral due to lack of secondary market for PV. • Ownership of REC’s is unclear. (e.g. If the bank has the PV system as collateral, do they own the RECs?) • Local banks have the right community incentives, but lack the scale to cover CA customers. Larger banks may have the opposite problem.

* The Community Reinvestment Act (CRA) is intended to encourage depository institutions to help meet the credit needs of the communities in which they operate, including low- and moderate-income neighborhoods. It was signed into law in 1977, and revised in May 1995.

**Joint Power Authority (JPA) is an organization comprised of two or more public agencies, including cities, counties and special districts, that have come together to accompany a common public purpose. Under state law, JPAs have authority to hire staff, enter into contracts and issue debt. As a separate legal entity, a JPA can adopt its own rules and regulations, pursuant to state law.

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LOCAL GOVERNMENT		
Value Proposition of ZENH	Business Model Elements	Barriers
<ul style="list-style-type: none">• City is able to meet residents’ demand for “green/clean” buildings.• City is viewed as environmental stewards and helps to reduce local emissions.• City elected officials viewed as progressive, increasing political capital.• Offset local fossil fuel generation, improving air quality and public health.• Distributed PV, especially with storage, increases residential electric reliability.• Attracts economic development in the form of PV installation jobs.• Could increase property values.• Improves grid stability and resilience to peak loading.	<ul style="list-style-type: none">• Lead by example: Install PV on government facilities through mandate or strong initiative.• Establish low-interest revolving loan fund for home buyers, builders and creative third party businesses that facilitate PV on new home construction.• Offer financing mechanisms that allow homeowners to pass on the PV financing obligation to the next homeowner to alleviate risk of stranded investment. “Pay-As-You-Save” utility and municipal loan programs exist in which homeowner loans carry over to new owners and need not be retired at time of property sale.• Mandate a percentage of low-income housing be installed with PV (financed in-part by city, or under discretion).• Establish special development zones (or sub-divisions) with incentives for PV homes (expedited permits and approvals, waivers on property taxes and other fees).• Partner with other local governments to create a regional initiative; allows economies of scale in developing policy and implementation. Also sends a clear message to builders and homebuyers.• Identify and remove most serious roadblocks.(Consider fast track of local processes for builders using PV, including environmental requirements and inspections; standardize PV system inspections; adopt rules for appraisers so that PV is considered part of the roofing material/value; educate appraisers, permitting staff and code inspectors on how to deal with PV systems.)	<ul style="list-style-type: none">• Government is inherently conservative; slow to adopt new ideas and technologies• Changes to plans, codes and standards may take considerable resources and time.• Some business model elements many need support of multiple jurisdictions, which is extremely difficult.• All constituents may not support PV policies and goals.• The law may restrict use of public funds to finance or guarantee finance for private benefit.• Lack of education about PV by local code officials and appraisers.

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UTILITIES		
Value Proposition of ZENH	Business Model Elements	Barriers
<ul style="list-style-type: none">• May provide access to RECs and compliance with RPS or other mandates if utility owns, finances or subsidizes the system.• Reduces peak loads.• If utility owns system, it prevents revenue loss from customer or third party independently putting PV on new home.	<ul style="list-style-type: none">• Agree to standard interconnection requirements across the state to streamline process for builder.• Install PV on homeowner’s roof and charge homeowner monthly in electric bill as lease or finance payment.• Develop provisions for a feed-in tariff.• Integrate distributed PV into utility’s power supply mix.• Sell smart meters and simple diagnostic equipment to homeowners; allowing them to view and understand (in a compelling and understandable manner) PV system output and anticipate systems problems.• Include solar in Demand Response Programs since solar peak and demand peak usually match.• Work with builders and others to size PV to match air conditioning load (deemed optimal).	<ul style="list-style-type: none">• Value of PV uncertain to utility.• Utility ownership of distributed generation assets is uncertain.• Utility perceives PV as potentially eroding revenue base.• Energy consumption in new residential construction may not peak until after grid peaking; thus reducing the value of PV to the utility.